State of Illinois
Department of Registration and Education
STATE GEOLOGICAL SURVEY DIVISION
John C. Frye, Chief

GUIDE LEAFLET

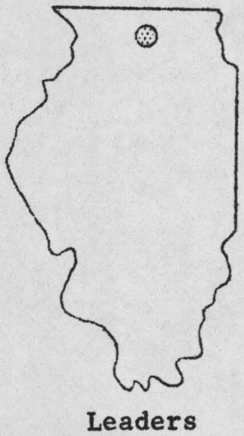
GEOLOGICAL SCIENCE FIELD TRIP

Sponsored by
ILLINOIS STATE GEOLOGICAL SURVEY, URBANA

BYRON AREA

Ogle and Winnebago Counties

Oregon and Kings Quadrangles



Leaders
George Wilson, David Reinertsen, and William Cote
Urbana, Illinois
May 21, 1966

GUIDE LEAFLET 1966 C HOST: Byron Community High School

BYRON GEOLOGICAL SCIENCE FIELD TRIP

Glacial History of Illinois

A knowledge of Illinois glacial history and the glacial deposits is helpful for better appreciation of many points of geologic interest in the Byron area. The following summary is a brief introduction to these subjects and should be read before the field trip begins.

Thousands of years ago much of northern North America was covered by huge glaciers. These glaciers, which advanced from centers in eastern and central Canada, developed when the mean annual temperatures were a few degrees lower than they are now and the winter snows did not completely melt during the summers. After many years a sheet of ice accumulated that was so thick its weight caused it to flow outward, carrying with it the soil and rocks on which it rested and over which it moved.

The Pleistocene Epoch or "Great Ice Age" began about one million years ago and ended about five thousand years ago. During this epoch, there were four major ages of glaciation, each followed by a long interglacial age characterized by climatic conditions much as they are today (see figure 1 and attached Pleistocene Time Table).

The oldest glacial age is the Nebraskan, named after the state of Nebraska where extensive Nebraskan deposits are buried beneath the younger glacial drift. In Illinois the Nebraskan deposits are also buried, and there are only rare exposures of Nebraskan till. A warm climatic interval called the Aftonian (interglacial) Age followed the melting of the Nebraskan glacier, and a soil was formed in the top of the Nebraskan drift.

The next glacial climate produced the Kansan glacier, which left thick deposits of till and outwash sand and gravel in Illinois when it melted away. The Kansan Age was followed by the Yarmouthian (interglacial) Age. During this age erosion carved valleys and hills, and a soil was formed in the Kansan deposits.

The third glacial age, the Illinoian, is particularly important to the residents of Illinois. It covered 80 percent of the state (fig. 2), reaching southward to Carbondale and Harrisburg. After several thousand years, a warm age, called the Sangamonian, caused the Illinoian ice sheet to melt away. During Sangamonian time, the upper part of the deposits left by the Illinoian glacier was weathered and a soil developed, as in the preceding Yarmouthian and Aftonian intervals. These ancient Sangamonian soils resemble present-day soils in color, texture, and depth, suggesting that the climate during interglacial times was similar to our present climate.

The last and most recent glacial age in Illinois was the Wisconsinan, which began about 70,000 years ago. The Wisconsinan comprised three major glacial advances - the Altonian, the Woodfordian, and the Valderan. Little is known about the exact extent of the Altonian glacier (fig. 1, #9), as its deposits were overridden by later glaciers, except in northern Illinois. The Woodfordian glacier advanced southward from the Lake Michigan basin to the present sites of Shelbyville, Decatur, Charleston, and Peoria. The Valderan glacier reached its maximum extent near Milwaukee, Wisconsin, and did not enter Illinois.

When the glaciers melted, the rock materials carried by the ice were deposited. These materials are called <u>glacial drift</u>. Some of the glacial drift

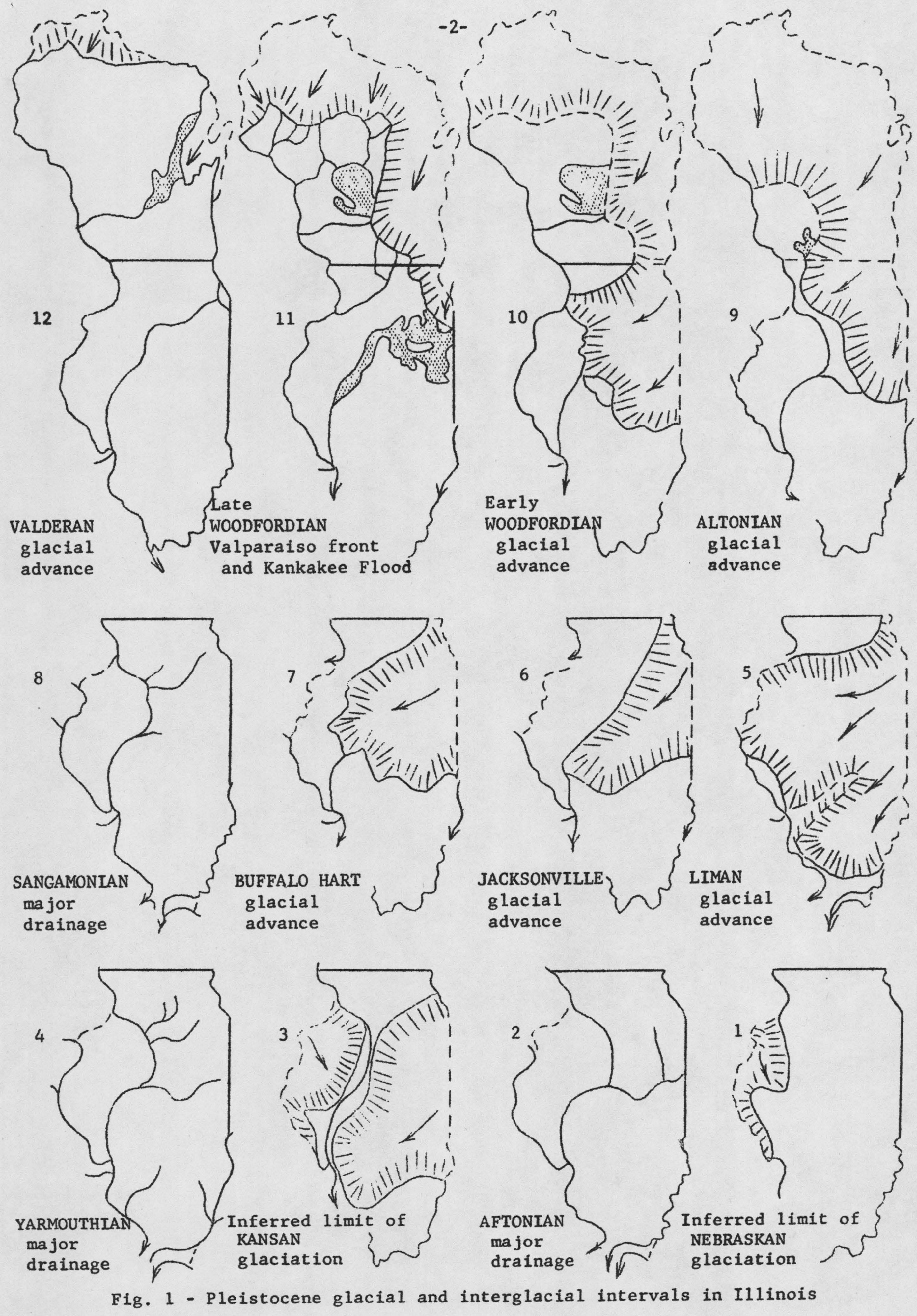
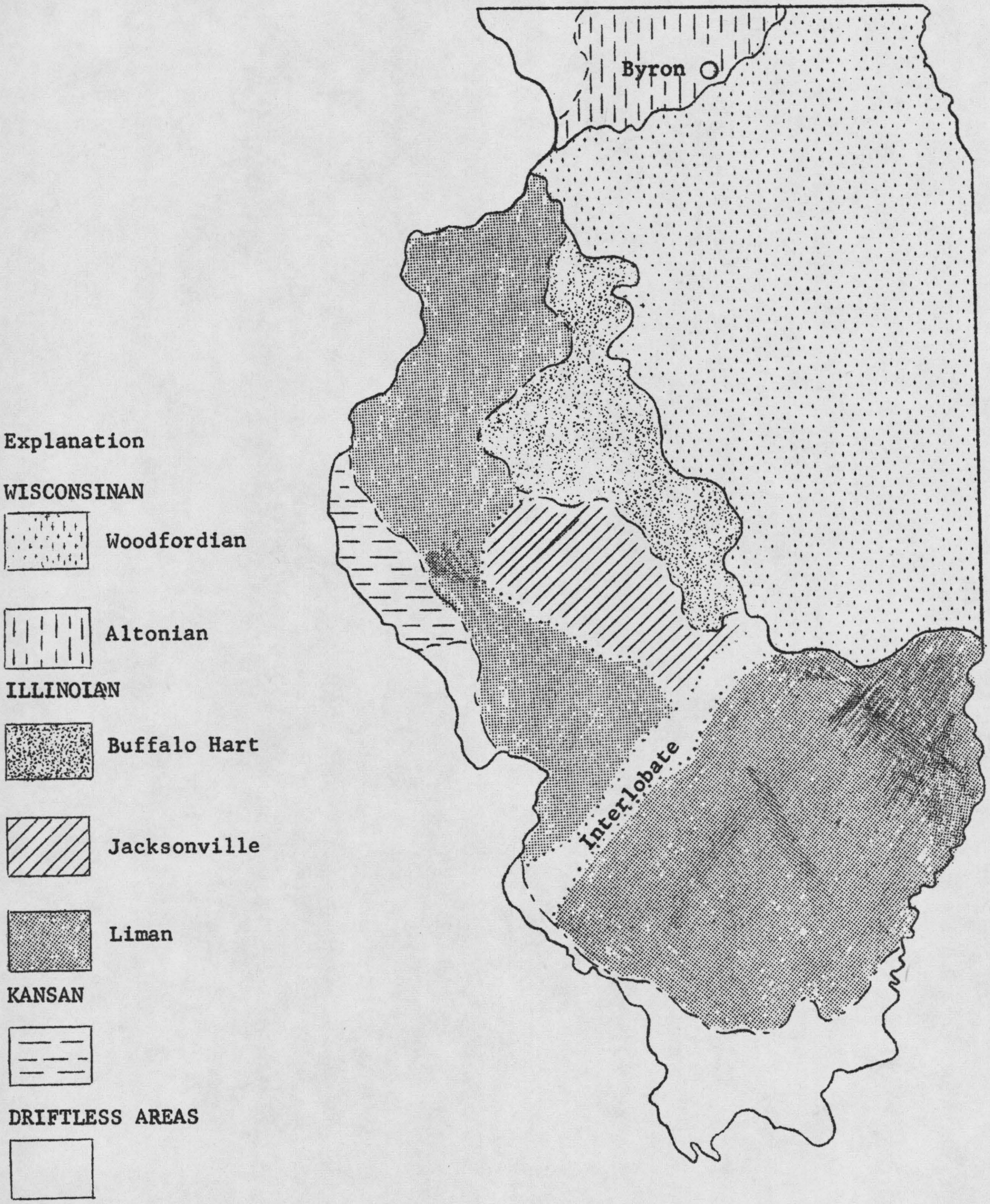


Fig. 1 - Pleistocene glacial and interglacial intervals in Illinois

Fig. 2. Areas underlain by tills of the Kansan, Illinoian, and Wisconsinan Stages. Older tills can be traced beneath younger tills in the subsurface.



was washed out with the meltwaters. The coarsest material (gravel, sand) carried by the meltwater was deposited nearest the ice front, and the finer material (silt, clay) was carried farther away, some all the way to the sea. Where the outwash material was spread widely along the front of the glacier, outwash plains were formed. Where the outwash was deposited in the stream valleys it formed valley train deposits. Many valley trains in Illinois are buried beneath younger glacial drifts.

Glacial drift deposited directly by the ice is called till. It is unsorted and unstratified and consists of a mixture of all kinds and sizes of rock fragments.

An end moraine is an accumulation of till and outwash deposited along an ice margin when the rate of advance and the rate of melting of a glacier were essentially in balance. As more and more rock debris was carried to the edge of the glacier, it piled up and formed a ridge.

The surface relief of end moraines is generally greater than that of the surrounding area and is referred to as swell-and-swale or knob-and-kettle topography. The flatter areas behind end moraines are called ground moraines or till plains.

At times, especially in the fall and winter, the meltwaters subsided, exposing the valley trains. The wind picked up silt and fine sand from their floodplains and dropped these materials on the bluffs and uplands to form deposits of loess. Loess mantles most of Illinois. Near the large river valleys, such as the Mississippi, it is as much as 60 to 80 feet thick, but it thins rapidly away from the valleys.

The importance of the Pleistocene Epoch to Illinois is emphasized by the rich soils formed in the glacial deposits and by the abundant deposits of sand and gravel. The glacial outwash, especially buried valley trains, is an important source of ground water. The state would not have these valuable resources if the glaciers had not invaded Illinois.

Itinerary

0.0	0.0	Assemble at Byron High School. Proceed west. Enter blacktop road and turn left (south) on Colfax Street.
0.3	0.3	STOP. Intersection with West Blackhawk Drive (Routes 2 and 72). Turn right (west) on Route 72.
0.9	1.2	Turn right on Route 72 and continue ahead (northwest).
3.5	4.7	Small abandoned limestone quarry on the left side of the highway.
0.6	5.3	Seward Road intersection. Continue ahead (west) on Route 72.
0.1	5.4	Notice the excellent view of the glacial topography straight ahead (west).
0.7	6.1	SLOW. Prepare to turn right.
0.2	6.3	Turn right (north) on gravel road.
0.2	6.5	CAUTION. UNGUARDED RAILROAD CROSSING. TWO TRACKS.

0.3 6.8 Stop 1. Altonian till exposure along the right side of the road (along west line of NW¼, SW¼, sec. 29, T. 25 N., R. 10 E.).

Units exposed in the section from the top down are as follows:

	Thickness
PLEISTOCENE SERIES	
RECENT STAGE	
Recent Soil	
A zone - dark brown, friable, fine, noncalcareous	1' 6"
B zone - somewhat lighter brown than above, very stony, mainly a chert residuum, noncalcareous	2-3'
WISCONSINAN STAGE	
ALTONIAN SUBSTAGE	
Till - medium brown, stony with rock materials ranging up to cobble size and consisting of various types of igneous rocks as well as smaller fragments of limestone, sandstone, and chert; upper part of this zone is oxidized, quite clayey, and calcareous	4'
Till - dark brown to drab, very stony, much harder than unit above, calcareous, base of unit not exposed in ditch	4'+

0.0 6.8 Leave Stop 1. Continue north.

0.8 7.6 CAUTION. Crossroads. Turn left (west).

0.4 8.0 Notice the view to the left across the valley of Leaf River.

0.6 8.6 Private road entering from the right. About a quarter of a mile north of here is an area being tested for gas storage.

0.6 9.2 STOP. Intersection with blacktop in Lightsville. Turn left (south).

0.5 9.7 Notice the contour farming on the left side.

0.4 10.1 Stop 2. Ordovician Platteville Dolomite, Glenwood Formation, and St. Peter Sandstone exposed in roadcut (SE¼, SW¼, sec. 25, T. 25 N., R. 9 E.).

A generalized description of the geologic section is as follows:

	Thickness
ORDOVICIAN SYSTEM	
CHAMPLAINIAN SERIES	
Platteville Dolomite - thin-bedded where weathered, argillaceous, yellow-brown, fossiliferous. (NOTE: The area just to the west near the farm buildings is underlain by the Platteville Dolomite	

	Thickness
also, which dips south 35° west at about 8°. Therefore, there is a considerable thickness of this unit exposed in this immediate vicinity.) Near the center of the section the dips are 2° to 3° to the northwest.	4'+
Glenwood Formation - siltstone, thin bedded, shaly in part, fine to medium grained, argillaceous, green to tan to brown.	12±
St. Peter Sandstone - medium grained, gray on weathered surfaces, white on fresh exposure in lower half of cut and pink and tan in the upper part, thick bedded to massive, bottom not exposed. This is the oldest exposed rock unit to be studied today.	16½+

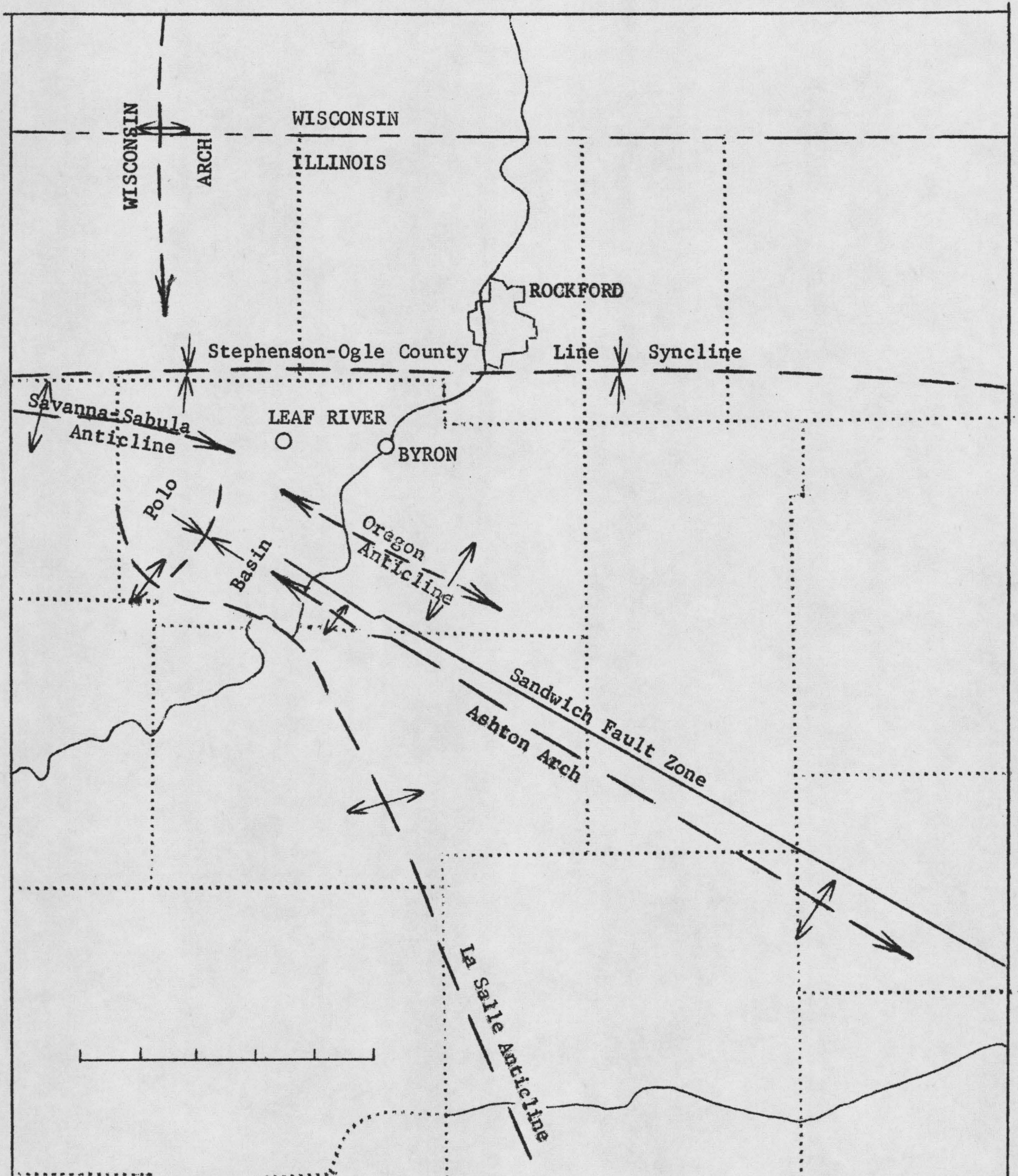
The St. Peter Sandstone, which is a very pure sandstone, is quarried near Ottawa. It is the source of silica sand which is used as glass sand, molding sand, abrasives, and for scores of other uses. The oil industry uses the sand in the fracture-treatment of oil-bearing formations to increase the production of oil.

There is an unconformity (erosion surface) between the St. Peter Sandstone and the underlying older sedimentary rocks throughout Illinois (see attached geologic column in back of guide leaflet). Prior to the deposition of St. Peter Sandstone, the early Ordovician sea withdrew from Illinois, and there was a major interval of erosion. Much of the material deposited in the early Ordovician seas was stripped off the Ashton Arch, and in places the erosion cut into Cambrian rocks. There is evidence that a river system drained across the region from the northeast, cutting deep channels into the early Ordovician and Cambrian rocks of northeastern Illinois. When the St. Peter sea advanced into Illinois, clean, well-sorted quartz sand was deposited on this erosional surface. The formation is generally less than 200 feet thick, but where the sand filled the old river channels, the St. Peter Sandstone is locally as much as 500 feet thick. Survey geologist T. C. Buschbach recently presented evidence that some of the large thicknesses of the formation in northeastern Illinois result from deposition of the sandstone in sinkholes, rather than in river channels. The sinkholes were formed by solution of the early Ordovician limestones during the pre-St. Peter erosion interval.

The exposures of St. Peter Sandstone and older formations are in areas of anticlines or uplifts. The extent of the exposures is largely dependent upon depth of erosion, with the older rocks exposed in the valleys.

Interesting structural features influence the bedrock topography of this area (see figure 3 and attached geologic map). These features noted from southern Ogle County northward are: the LaSalle Anticline, the Ashton Arch, the Sandwich Fault, the Savanna-Sabula Anticline, the Stephenson-Ogle County Line Syncline, and the Wisconsin Arch.

The LaSalle Anticline is sharply defined as far north as southeastern Lee County, about 30 miles south-southeast of Byron. Although it merges with the Ashton Arch in southeastern Lee County, it seems to



GEOLOGIC FEATURES

reappear in the Dixon area, about 25 miles southwest of Byron. This anticline is the southward extension of the broad Wisconsin Arch.

The Ashton Arch is the major structural feature of the area. It is a broad, high anticline that brings Cambrian formations to the bedrock surface. This arch extends from the Rock River southeastward for about 80 miles into Kendall County. The Ashton Arch is bounded along its northern side by the Sandwich Fault. This fault has a maximum downthrow of 900 feet on the north side, southeast of this field trip area.

The Oregon Anticline parallels the north side of the northwestern part of the Ashton Arch and is separated from it by a narrow graben or syncline. West of the Rock River the west end of the Ashton Arch and the west flank of the Oregon Anticline plunge abruptly into the Polo Basin.

The Stephenson-Ogle County Line Syncline separates the Byron area from the broad Wisconsin Arch to the north. The course of Pecatonica River to the north may be related to this flexure.

The small structure here at Stop 2 is either a small anticline or dome that has been developed on the flanks of the Oregon Anticline and Stephenson-Ogle County Line Syncline. The roadcut appears to be just west of the crest of this small structure.

Although many of these structures were active in early and middle Ordovician time, and faulting with at least 235 feet of displacement occurred in pre-St. Peter time, in other areas the major movements along the major structures were in post-Mississippian - pre-Pennsylvanian time and in the late Pennsylvanian or Permian Periods.

0.0 10.1 Leave Stop 2. Continue south.

0.1 10.2 On the left (east) is a quarry in Platteville Dolomite. The underlying Glenwood Formation is also exposed. Continue ahead (south) into Leaf River.

0.1 10.3 Cross bridge over Leaf River and enter town. SLOW.

0.2 10.5 CAUTION. RAILROAD CROSSING. THREE TRACKS.

0.2 10.7 STOP. Intersection of Main Street and West Third Street (Route 72). Turn left (east) on Route 72.

0.6 11.3 Crossing Leaf River.

2.0 13.3 Seward Road intersection. Continue straight ahead (east).

3.8 17.1 SLOW. Approaching junction with Route 2.

0.1 17.2 Bear left and continue ahead (east) toward Byron.

0.1 17.3 STOP. Intersection with Route 2. Continue ahead (east).

0.4 17.7 SLOW. Enter Byron city limits.

0.9 18.6 Intersection of Routes 72 and 2. Continue ahead (east) on Route 2.

1.2 19.8 Abandoned gravel pit on the right side of the highway.

0.1 19.9 Stop 3. On the left is Lake Louise, a recreational area, that has been developed in an old, abandoned gravel pit. This is an excellent example of what can be done with abandoned gravel pits and quarries if properly managed.

0.0 19.9 Leave Stop 3. Continue north.

0.8 20.7 To the right (northeast) note the narrow valley and steep bluffs along the Rock River. This is one of the narrows of the Rock River.

0.4 21.1 Bear left on Kennedy Hill Road. CAUTION.

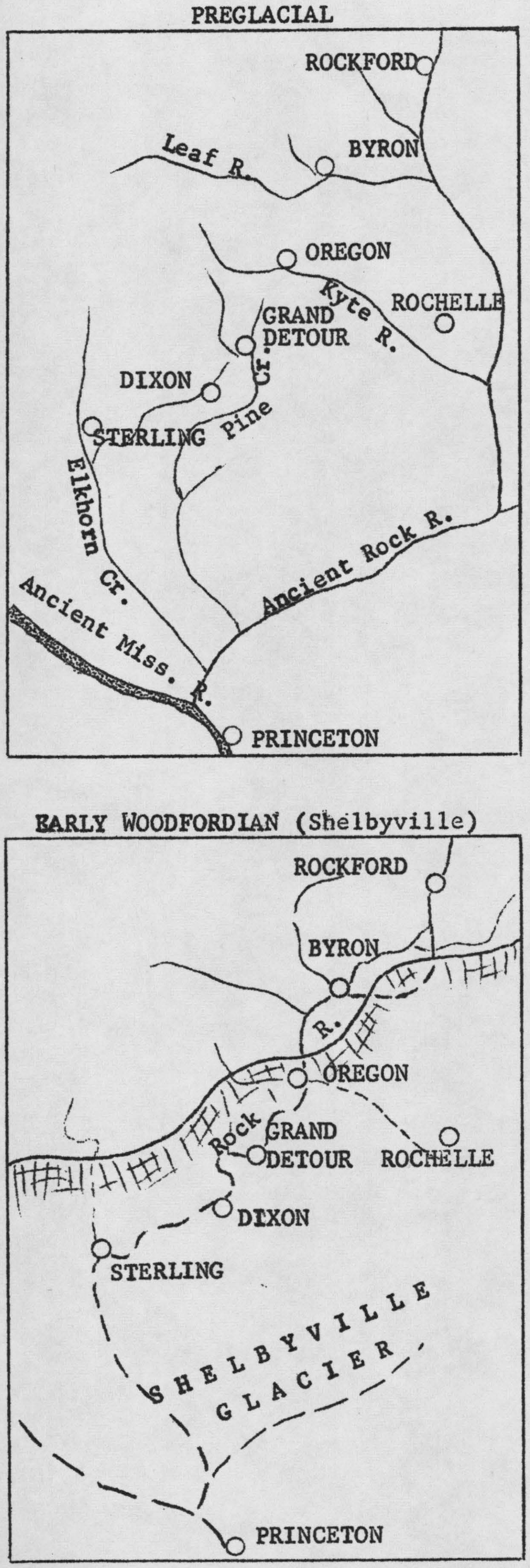
0.4 21.5 Stop 4. Discussion of the Pleistocene history of Rock River Valley (NE¼, NE¼, sec. 20, T. 25 N., R. 11 E.).

The preglacial Rock River (fig. 4) flowed southward from Rockford to the vicinity of Princeton, where it joined the southeastward-trending Ancient Mississippi River. The preglacial Rock River Valley lay about 25 miles east of Dixon and was joined by three major eastward-flowing tributaries that followed the present valleys of the Pecatonica River, of Leaf River and Stillman Creek, and of Gale Creek and Kyte River. Preglacial Pine Creek flowed southward for about six miles past Grand Detour, and then turned southwestward, passing south of Dixon to join the ancestral Rock River.

During early Wisconsinan time the Altonian glaciers covered the area and the ancestral Rock Valley south of Rockford was filled with drift. The waters of Rock River backed up in the Leaf River—Stillman Creek bedrock valley until they overtopped a narrow divide at Oregon, flowed into the valleys of Pine Creek and Elkhorn Creek, and thence flowed southward to the Ancient Mississippi Valley. Entrenchment of the river through the divide at Oregon produced the present deep, narrow valley around the site of the Black Hawk statue. Because drift blocked Pine Creek Valley south of Grand Detour, the post-Altonian Rock River swung northward in a great loop and then flowed west along its present route past Dixon to Sterling, where it assumed a portion of southward-flowing Elkhorn Creek. The flow of water in the Stillman Creek and Kyte River Valleys was reversed, so that these streams now flow westward to join Rock River.

The Shelbyville ice sheet, representing the initial advance of the Woodfordian glacier, invaded the eastern and southern parts of the area. Advancing from the east, the ice blocked Rock River between Rockford and Byron and forced the river westward, where it cut a deep gorge in Galena Dolomite. A portion of this gorge, which represents the youngest part of the present valley, can be seen here at Stop 4.

The Shelbyville glacier also advanced across Rock River north of Oregon, and the river must have been diverted to a temporary, more westerly route. When the glacier melted away, the Rock River resumed its pre-Shelbyville valley from Oregon to Sterling, but had abandoned the channel southward to Princeton. The Shelbyville glacier also permanently diverted the Ancient Mississippi River westward to its



1 inch = 16 miles

Figure 4. Pleistocene drainage changes of Rock River

present valley. The Rock River then extended its present valley from Sterling westward to the present Mississippi. The abandoned portions of the bedrock valleys of the Mississippi and Rock Rivers, now filled and buried by glacial drift, are important ground-water aquifers.

Later during the Woodfordian glaciation, when the Bloomington Moraine was deposited, a broad area on the south side of Rock Valley was covered with outwash which consists mainly of pebbly sand.

The Green Bay lobe of the late Woodfordian glaciation (Valparaiso) reached Janesville, Wisconsin, and built a valley train of sand and gravel in Rock Valley. Deposition of this material reduced the topographic relief of the valley by about 100 feet. The surface of this valley train is about 45 feet above the present floodplain. Subsequent down-cutting of the Mississippi and Rock Valleys and deposition of a later Valparaiso valley train produced a lower terrace about 20 feet above the present floodplain of Rock River.

0.0 21.5 Leave Stop 4. Continue north.

0.5 22.0 Turn left (west) on the gravel road.

0.8 22.8 T-road intersection. Turn left (south) on gravel road.

1.0 23.8 Ahead note the excellent view of the Rock River Valley.

0.5 24.3 Sharp right turn.

0.2 24.5 Sharp left turn.

0.6 25.1 Stop 5. Byron Materials Quarry (NE¼, SE¼, sec. 30, T. 25 N., R. 11 E.).

About 60 feet of the Platteville Dolomite is quarried here. The most prominent set of joints (vertical fractures) are oriented north 75° west, whereas the other set of joints is oriented about north 37° east. A generalized section here is as follows:

	Thickness
ORDOVICIAN SYSTEM	
CHAMPLAINIAN SERIES	
PLATTEVILLE GROUP	
Quimbys Mill Formation - dolomite, yellowish-brown on weathered surfaces, thin-bedded, cherty	10'±
Nachusa Formation - dolomite, light to medium gray with much yellowish-brown staining on weathered surfaces (the well-developed joint pattern permits this coloration to extend from the top to the floor of the quarry), several fossiliferous zones are present, especially at the level of the bench on the southwest side of the quarry (about 30 feet above the floor).	50'±

0.0 25.1 Leave Stop 5. Continue south.

0.4 25.5 CAUTION. RAILROAD CROSSING. FOUR TRACKS.

0.1 25.6 CAUTION. UNGUARDED RAILROAD CROSSING. THREE TRACKS.

0.1 25.7 Turn right (west) on West Fourth Street.

0.2 25.9 SLOW. Enter the Byron school grounds.

Stop 6. Lunch.

0.0 25.9 Leave school grounds. Continue ahead (west).

0.1 26.0 Turn left (south) on blacktop (North Colfax Street).

0.3 26.3 STOP. West Blackhawk Drive, Routes 2 and 72. Turn left (east).

0.4 26.7 Intersection of Routes 2 and 72. Turn right (south) on Route 72.

0.2 26.9 Cross Rock River.

0.1 27.0 Turn right and continue straight ahead on blacktop leaving Highway 72.

0.1 27.1 Crossroads. Continue straight ahead (south) uphill on blacktop. Note Platteville Dolomite cropping out along the left side of the road.

0.3 27.4 Stop 7. Abandoned quarry in Platteville Dolomite (NE¼, NW¼, sec. 5, T. 24 N., R. 11 E.).

At this locality the Platteville Dolomite is also highly jointed, although the joints do not appear to be as consistent in orientation as those developed at Stop 5 north of Byron. One set trends about north 57° west, while the other set trends north 35° to 40° west. In addition, there is one well-developed face that is oriented almost east-west. The following generalized section is exposed here:

	Thickness
ORDOVICIAN SYSTEM	
CHAMPLAINIAN SERIES	
PLATTEVILLE GROUP	
Quimbys Mill Formation - dolomite, thin-bedded, yellow-brown weathering stain throughout, contains several pronounced, persistent chert stringers	13'±
Nachusa Formation - dolomite, yellowish-brown, thick bedded, fossiliferous with corals, brachiopods, and cephalopods	38'±

0.0 27.4 Leave Stop 7. Continue south.

0.7 28.1 T-road intersection with gravel road. Turn left (east).

0.8 28.9 Y-intersection. Turn left (north).

0.3 29.2 T-road intersection from right. Continue ahead (north).

0.7 29.9 T-road intersection. Turn right and proceed under railroad underpass. SLOW. Cross narrow bridge immediately on other side and approach highway. CAUTION.

0.1 30.0 STOP. Intersection with Highway 72. Continue ahead (east).

0.5 30.5 SLOW. Prepare to turn left.

0.1 30.6 Turn left (northeast) on gravel road. Note the sandy soil in the roadcut and how black and rich-looking the tilled soil is in the fields to the left.

0.3 30.9 Cross Stillman Creek.

0.4 31.3 STOP. UNGUARDED RAILROAD CROSSING.

0.1 31.4 Stop 8. Exposure of sand in roadcut (near center of north line SE¼, NE¼, sec. 33, T. 25 N., R. 11 E.).

This exposure shows the well-sorted character of sand that has been transported and deposited by the wind. The east roadcut shows a thickness of five to six feet of fine-grained sand containing a four- to five-inch peaty zone in about the middle. The small amount of gravel at the north end of the exposure probably was dragged to this position during grading and ditching of the road, since it does not seem to occur in a fresh cut.

0.0 31.4 Leave Stop 8. Continue northeast.

0.1 31.5 T-road intersection. Turn right (southeast) on gravel road.

1.4 32.9 T-road intersection from left. Continue straight ahead (east).

0.2 33.1 On the left in the distance is a cut that is an abandoned gravel pit in an esker. For about the next 3 miles esker segments occur along the upland on the left.

Eskers are ridges of channel sand and gravel deposited by meltwater streams flowing in, on, or under a stagnant glacier. Dr. R. F. Flint in his book, "Glacial and Pleistocene Geology," discusses ways in which eskers may form:

"Eskers are formed in several distinct ways, of which two seem to be more common than the others. The most common mode of origin appears to have been in tunnels (less commonly in open canals) at the base of the glacier, during so late a phase of deglaciation that the ice was thin and stagnant or nearly so. It is unlikely that tunnels could easily form or, once formed, stay open unless the ice that inclosed them was nearly motionless. If stagnant, the ice must also have been thin. Water derived chiefly from surface melting worked its way downward through crevasses and other openings and at the base of the ice enlarged systems of openings to form tunnels. The lowest possible channelways were sought, which is why eskers generally occupy valleys. Passing through these openings, chiefly under hydrostatic pressure, the water emerged in ponded bodies (a glacial lake or the sea) at the glacier's terminus. There is little in the eskers to indicate whether a long individual was formed at the same time throughout its length, or whether its downstream part was built first and was gradually added to in the upstream direction as thinning and stagnation affected an increasingly wide terminal zone. Unless the whole of the esker, after completion, was protected by inclosing ice, it is not easy to account for its preservation from destruction by proglacial stream erosion or from burial beneath outwash.

Two other hypotheses are that eskers form in superglacial stream valleys and in englacial tunnels respectively. Both hypotheses state that as the glacier thins the deposited sediments are gradually let down onto the ground beneath. One merit claimed for these hypotheses is that they explain the tendency of some eskers to climb over divides, without the necessity of supposing that the streams were controlled hydrostatically."

1.2 34.3 STOP. Crossroads. Turn left (north) on blacktop—Stillman Valley-Rockford Road.

0.6 34.9 T-road intersection from right. Turn right (east) on gravel road.

0.1 35.0 Abandoned sand and gravel pit on the left.

0.6 35.6 Stop 9. Exposure of Platteville and Galena Dolomites in abandoned quarry, N½, NW¼, NE¼, sec. 18, T. 42 N., R. 1 E.

The following is a generalized section from the top down:

	Thickness
QUATERNARY SYSTEM	
PLEISTOCENE SERIES	
WISCONSINAN STAGE	
ALTONIAN SUBSTAGE	
Winnebago till - reddish, igneous inclusions of various types range in size up to boulders, fairly hard	15'±
ORDOVICIAN SYSTEM	
CHAMPLAINIAN SERIES	
GALENA GROUP	
Galena Dolomite - brownish gray, pitted weathered surfaces, quite blocky, massive-bedded, highly jointed and fractured	18'±
PLATTEVILLE GROUP	
Quimbys Mill Formation - dolomite, yellow-brown, thin-bedded, contains rather frequent chert bands up to three inches in thickness	20'±
Nachusa Formation - dolomite, yellow-brown, thick-bedded, fossiliferous in some zones, bottom not exposed	20'±

0.0 35.6 Leave Stop 9. Continue east.

0.3 35.9 Toward the left (northeast) in the distance is a farm with a silo and white farmhouse on a hill. This is the northeastern extent of the esker.

0.7 36.6 STOP. Crossroads. Turn left (north) on blacktop.

0.7 37.3 Crossing the esker through which the road cuts.

0.1 37.4 Stop 10. Gravel pit in esker (center of west line NW NE sec. 8, T. 42 N., R. 1 E.).

This gravel ridge is an esker that is part of a series of esker segments in this immediate vicinity. These deposits were formed by a subglacial stream flowing at the base of the Shelbyville glacier. In the lower part of the pit on the west side of the road is a very coarse conglomerate with a calcium-carbonate cement and stained iron oxide. Although some of the gravel is very coarse, there is a considerable amount of sand present. In the roadcut a fine sandy, brown, leached silt is present on the south side of the ridge.

0.0 37.4 Leave Stop 10. Continue north.

0.2 37.6 Crossroads. Continue north on blacktop.

0.1 37.7 This little mound is the northern extent of the esker, which was discussed at Stop 10.

0.9 38.6 T-road from right at jog in blacktop road. Continue ahead (north).

1.1 39.7 STOP. Crossroads. Turn left (west).

0.1 39.8 Crossroads. Continue straight ahead (west). Kishwaukee School on the left.

0.9 40.7 STOP. T-road intersection. Turn right (northeast) on Kishwaukee Road.

1.5 42.2 Stop 11. Exposure of Altonian till in roadcut (N½, NW¼, SE¼, sec. 29, T. 43 N., R. 1 E.).

The upper part of this exposure is a dark brown soil horizon underlain by three or four feet of brownish-gray, clayey Winnebago till. The till is somewhat oxidized and calcareous throughout. Although the till is exposed westward along the road ditch for about 400 feet, its total thickness is not known here, because the till mantles a bedrock surface with high relief.

0.0 42.2 Leave Stop 11. Continue northeast.

0.3 42.5 T-road intersection from right—Stillman Valley Road and Kishwaukee Road. Continue ahead (northeast) on blacktop—Kishwaukee Road.

0.2 42.7 Long curve in Kishwaukee Road at T-intersection with road from the south. Continue straight ahead on Kishwaukee Road.

0.2 42.9 Roadcut in the Galena Dolomite.

0.1 43.0 Cross Kishwaukee River. Note the wide valley bottom and the very meandering course of the stream.

1.7 44.7 STOP. Junction with Belt Line Road. Turn left.
CAUTION. BELT LINE TRAFFIC DOES NOT STOP. Straight ahead of you is the Greater Rockford Municipal Airport, the former site of Camp Grant.

0.2 44.9 Stop 12. Abandoned gravel pit (near center of NE¼, SW¼, sec. 15, T. 43 N., R. 1 E.). Park on right shoulder of highway.
BE CAREFUL CROSSING HIGHWAY.

This gravel pit is located in glacial outwash of Altonian age at the west end of the Camp Grant area. Near the top of the section in several places there are some very peaty zones that are probably of Woodfordian age. The following section from the top downward is located in the southeastern part of the pit:

	Thickness
Soil zone - sandy loam, noncalcareous	15"
Reddish-brown, silty, sandy gravel with some minor amounts of clay, noncalcareous	4'
Grayish-brown, medium to coarse sand, gravelly, noncalcareous	1½'
Reddish-brown, silty sand, noncalcareous	1'
Coarse gravel and sand, noncalcareous	40'-50'

End of Field Trip

DRIVE CAREFULLY ON YOUR WAY HOME

GLOSSARY

Anticline - An upfold in which the rock strata have bent into an arch; the strata on each side of the arch are inclined in opposite directions away from the axis or crest.

Aquifer - A geologic formation that is water-bearing and which transmits water from one point to another.

Argillaceous - Composed of clay or containing a notable proportion of clay.

Bedrock - The solid rock underlying the unconsolidated surface materials - soil, sand, gravel, till, etc.

Bedrock valley - Drainageway eroded into the solid rock beneath the loose soil, sand, clay, etc.

Calcareous - Containing calcium carbonate, limy.

Chert - Silicon dioxide; a compact, massive rock composed of minute particles of quartz and/or chalcedony; similar to flint but light in color.

Dolomite - A mineral, calcium magnesium carbonate; applied to those sedimentary rocks that are composed largely of the mineral dolomite.

Dome - A (roughly) symmetrical upfold in which the strata are inclined in all directions from a central point.

Drift - All rock material transported by a glacier and deposited either directly by the ice or reworked and deposited by meltwater streams and the wind.

End moraine - A ridge-like accumulation of drift built along the margin of an ice sheet.

Esker - Ridges of stratified (layered) drift (sand and gravel) in areas of ground moraine marking channels of meltwater streams which flowed in, on, or under a glacier.

Fault - A fracture or fracture zone in the strata along which there has been movement of the two sides relative to one another.

Formation - The basic rock unit used to map and describe the strata, such as limestone, sandstone, shale, or combinations of these and other rock types.

Graben - A block that has moved down along bounding faults relative to the rocks on either side.

Ground moraine - A sheet-like accumulation of glacial drift, principally till, deposited beneath a glacier.

Ground water - Water that is present below the ground surface in the soil and rocks of the earth's outer crust.

Joint - A fracture or crack in rocks along which there has been no movement of the opposing sides.

Limestone - A sedimentary rock consisting chiefly of calcium carbonate (the mineral, calcite).

Loess - A homogeneous, unstratified deposit of silt deposited by the wind.

Outwash - Stratified drift (clay, silt, sand, gravel) that was deposited by meltwater streams in channels, deltas, outwash plains, on floodplains, and in glacial lakes.

Outwash plain - The surface of a broad body of outwash formed in front of a glacier.

Pro-, super-, en- glacial - In front of, on, or within a glacier.

Residuum - An accumulation of relatively insoluble materials and weathering products remaining essentially in place after the more soluble materials have been removed.

Sinkholes - Small circular depressions that have formed by solution in areas underlain by soluble rocks, most commonly limestone and dolomite.

Syncline - A fold in rocks in which the strata are bowed down and dip inward from both sides toward the axis; the opposite of anticline.

Till - Unsorted, unstratified drift deposited directly by glacial ice and consisting of a heterogeneous mixture of different sizes and kinds of rock fragments.

Till plain - The undulating surface of low relief in the area underlain by ground moraine.

Unconformity - A surface of erosion or nondeposition that separates younger strata from older rocks; most unconformities indicate intervals of time when former areas of the sea bottom were temporarily raised above sea level.

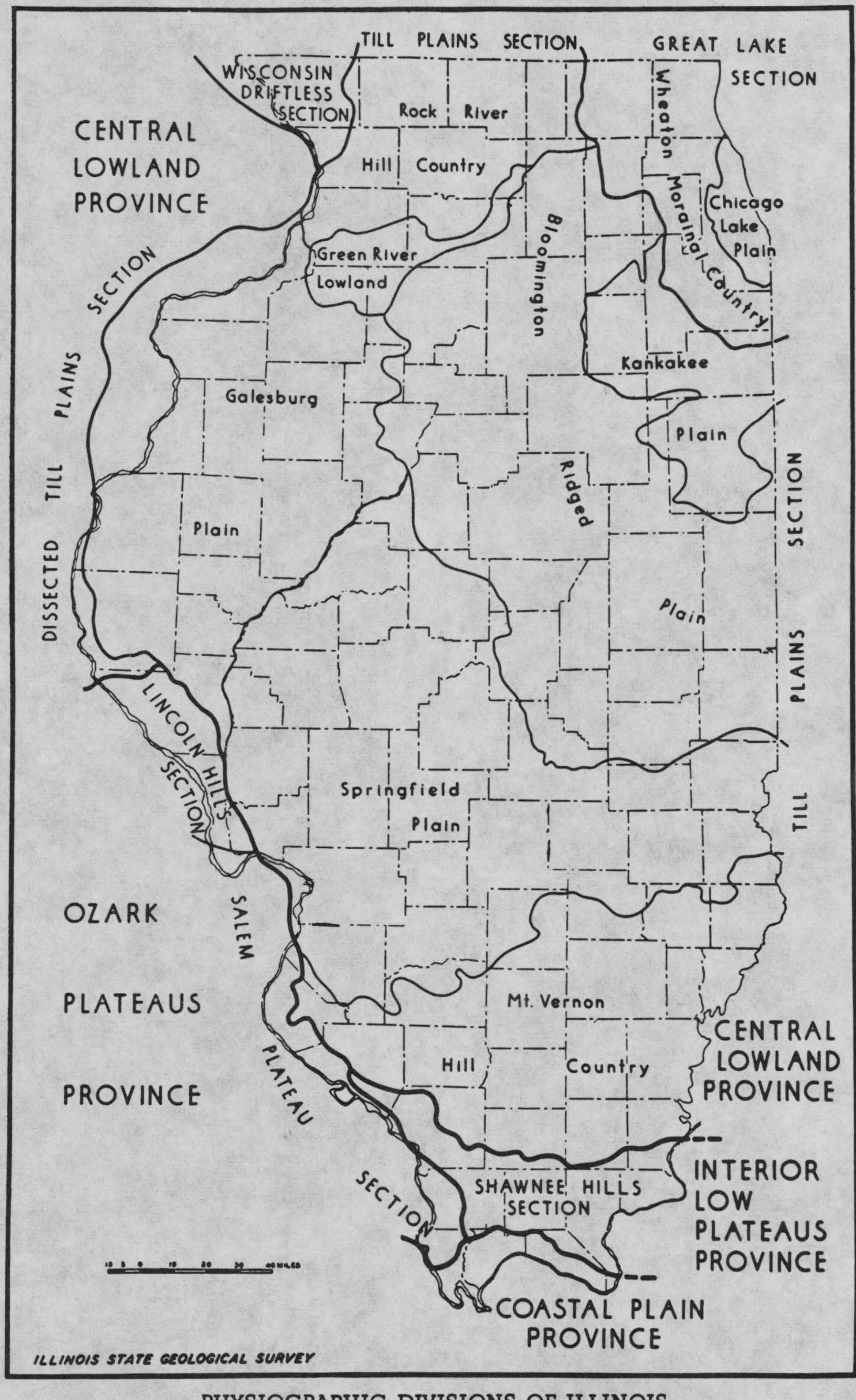
Valley trains - The accumulations of outwash deposited by rivers in the valleys downstream from a glacier.

TIME TABLE OF PLEISTOCENE GLACIATION
(after J. C. Frye and H. B. Willman, 1960)

STAGE	SUBSTAGE	NATURE OF DEPOSITS	SPECIAL FEATURES
RECENT	Years Before Present	Soil, youthful profile of weathering, lake and river deposits, dunes, peat	
	5,000		
WISCONSINAN (4th glacial)	Valderan	Outwash	Outwash along Mississippi Valley
	11,000		
	Twocreekan	Peat and alluvium	Ice withdrawal, erosion
	12,500		
	Woodfordian	Drift, loess, dunes, lake deposits	Glaciation, building of many moraines as far south as Shelbyville, extensive valley trains, outwash plains, and lakes
	22,000		
	Farmdalian	Soil, silt and peat	Ice withdrawal, weathering, and erosion
	28,000		
	Altonian	Drift, loess	Glaciation in northern Illinois, valley trains along major rivers, Winnebago drift
	50,000 to 70,000		
SANGAMONIAN (3rd interglacial)		Soil, mature profile of weathering, alluvium, peat	
ILLINOIAN (3rd glacial)	Buffalo Hart	Drift	Glaciers from northeast at maximum reached Mississippi River and nearly to southern tip of Illinois
	Jacksonville	Drift	
	Liman	Drift, loess	
YARMOUTHIAN (2nd interglacial)		Soil, mature profile of weathering, alluvium, peat	
KANSAN (2nd glacial)		Drift Loess	Glaciers from northeast and northwest covered much of state
AFTONIAN (1st interglacial)		Soil, mature profile of weathering, alluvium, peat	
NEBRASKAN (1st glacial)		Drift	Glaciers from northwest invaded western Illinois

GEOLOGIC COLUMN OF BYRON AREA

ERA	SYSTEM	SERIES	GROUP-STAGE	FORMATION-SUBSTAGE	LITHOLOGY
CENOZOIC	QUATERNARY	PLEISTOCENE	RECENT		Alluvium
			WISCONSINAN	TWOCREEKAN	Outwash
				WOODFORDIAN	Outwash, till
				FARMDALIAN	Peat
				ALTONIAN	Outwash, till
			Major Unconformity	PRE-ILLINOIAN ?	Outwash in bedrock valleys
MESOZOIC NOT REPRESENTED					
			Major Unconformity		
PALEOZOIC	ORDOVICIAN	CHAMPLAINIAN	GALENA	DUBUQUE	Dolomite
				WISE LAKE	Dolomite
				DUNLEITH	Dolomite
				GUTTENBERG	Dol., Ls.
				KINGS LAKE	Dol., Shale
			Unconformity	SPECHTS FERRY	Shale
			PLATTEVILLE	QUIMBYS MILL	Dol., Ls.
				NACHUSA	Dolomite
				GRAND DETOUR	Limestone
				MIFFLIN	Limestone
			Unconformity	PECATONICA	Dol., Ss.
			ANCELL	GLENWOOD	Dol., Ss., Sh.
			Major Unconformity	ST. PETER	Sandstone
		CANADIAN	PRAIRIE DU CHIEN	SHAKOPEE	Dolomite
				NEW RICHMOND	Sandstone
				ONEOTA	Dolomite
			Unconformity	GUNTER	Sandstone
	CAMBRIAN	CROIXAN		EMINENCE	Dolomite
				POTOSI	Dolomite
				FRANCONIA	Sandstone
				IRONTON	Sandstone
				GALESVILLE	Sandstone
				EAU CLAIRE	Dol., Ss., Sh.
			Major Unconformity	MT. SIMON	Sandstone
PRECAMBRIAN					Granite

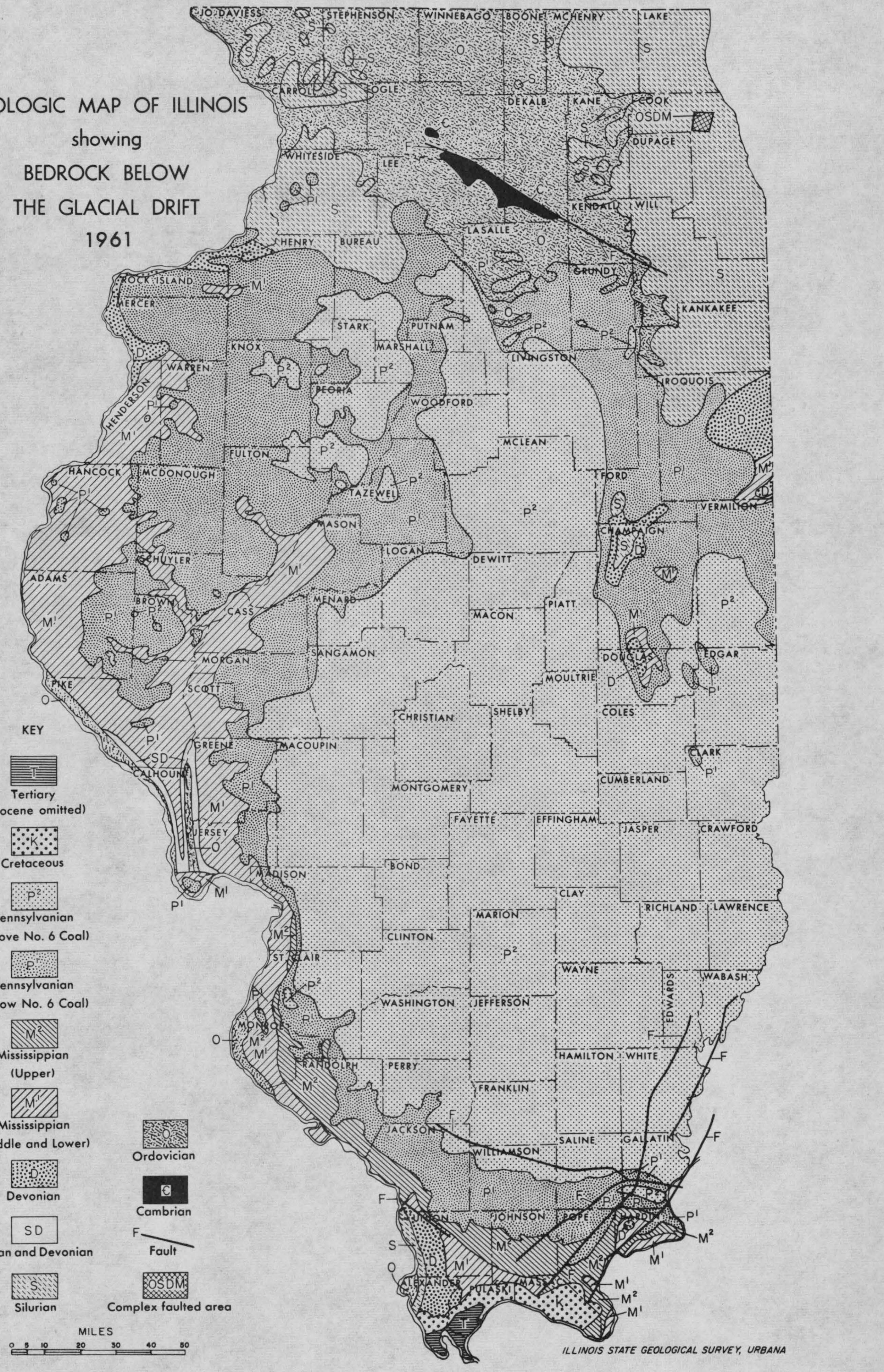


PHYSIOGRAPHIC DIVISIONS OF ILLINOIS

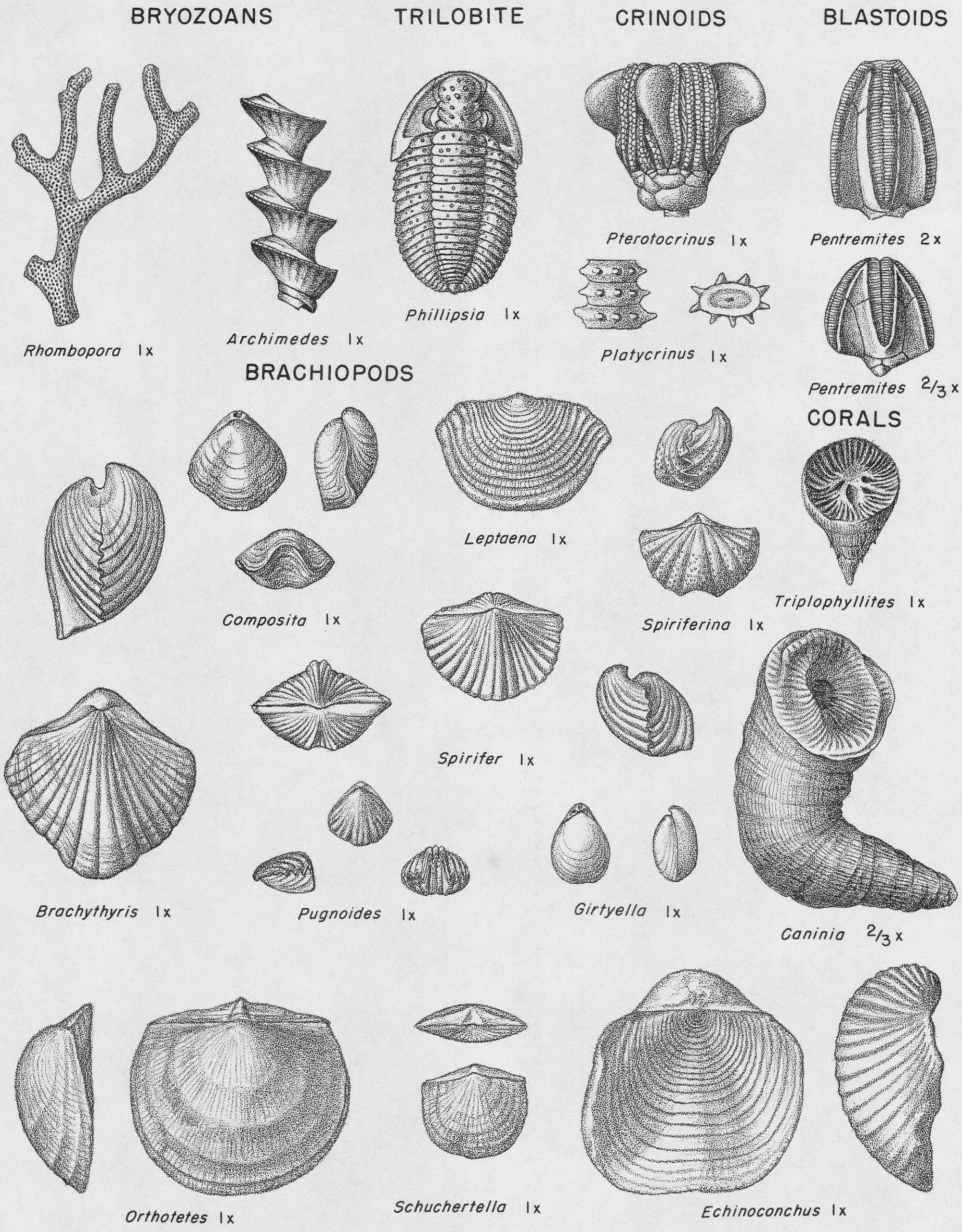
(Reprinted from Illinois State Geological Survey Report of Investigations 129, "Physiographic Divisions of Illinois," by M. M. Leighton, George E. Ekblaw, and Leland Horberg)

(82536—15M—11-63)

GEOLOGIC MAP OF ILLINOIS
showing
BEDROCK BELOW
THE GLACIAL DRIFT
1961



(82536—15M—11-63)


BRYOZOANS
TRILOBITE
CRINOIDS
BLASTOIDS
Rhombopora 1x
Archimedes 1x
Phillipsia 1x
Pterotocrinus 1x
Platycrinus 1x
Pentremites 2x
Pentremites 2/3 x
BRACHIOPODS
CORALS
Composita 1x
Leptaena 1x
Spiriferina 1x
Triplophyllites 1x
Spirifer 1x
Brachythyris 1x
Pugnoides 1x
Girtyella 1x
Caninia 2/3 x
Orthotetes 1x
Schuchertella 1x
Echinoconchus 1x

Field Trip - Byron - May 21 - 1966